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Science in the Soviet Regime

Empire of Knowledge. The Academy of Sciences of the USSR (1917–1970). ALEXANDER VUCINICH. University of California Press, Berkeley, 1984. x, 484 pp. $29.95.

For Western observers, the chronicle of Soviet science is full of apparent anomalies. During its history the Soviet regime has channeled vast resources into science while simultaneously encouraging ideological attacks on the scientists entrusted with those resources. Under Stalin the system produced outstanding achievements in fields such as physics and mathematics but virtually destroyed Soviet genetics. Having pioneered in the sociological study of the scientific community, the regime completely repudiated this kind of analysis in the 1930's, only to embrace it again in the 1960's. Thanks to such incongruities, the institutional patterns of Soviet science are both intriguing and difficult for outsiders to fathom.

Alexander Vucinich's book is an excellent point of departure for persons who want to know more about Soviet science as a social phenomenon. Wide-ranging and clearly written, it is the best available general study of the U.S.S.R. Academy of Sciences, the core of the Soviet basic research effort. Vucinich's central concerns are the autonomy and progress of science under the Soviet regime. He devotes special attention to Soviet debates over the intellectual standing of science—particularly the relationship between Marxist-Leninist doctrine and the content of particular scientific fields—and to the changes in the Academy's institutional structure that have affected the administrative freedom of the scientific community. In analyzing these problems, Vucinich traces the evolution of Soviet attitudes toward world science, gives capsule accounts of general trends in a broad range of Soviet academic disciplines, and presents a wealth of material on other aspects of scientific life in the U.S.S.R.

The book, which begins with a useful survey of the growth of Russian science before the Revolution, deals primarily with developments from 1917 to 1970. One of its underlying themes is that Soviet science has passed through several historical phases that are quite distinct from one another. The first post-revolutionary decade was characterized by Bolshevik uncertainty about the ideological treatment and administrative organization of science. During this period fundamental disagreements were aired over the relationship between Marxism and the natural sciences, and the Academy, little changed from the Tsarist years, coexisted uneasily with a new Communist Academy set up to establish the hegemony of Marxism in the social sciences. After 1929, however, there was a powerful Stalinist drive to amalgamate the natural sciences and Marxist philosophy, as well as to centralize the administration of research. The effects of this drive were complex. The Academy of Sciences underwent a political purge and lost the complete control it had previously exercised over the selection of its members. On the other hand, during the first dozen years of Stalin's rule it benefited from an enormous infusion of resources, and after the abolition of the Communist Academy in 1936 it became the preeminent institution for the conduct of basic research in both the natural and the social sciences.

Although Stalinism devastated the social sciences in the early 1930's, its most damaging impact on the natural sciences did not occur until the late 1940's, when Trofim Lysenko finally attained unchallenged dominance over biological research and Marxist ideologists mounted heavy attacks on other scientific fields as well. According to Vucinich, Soviet scientists suffered greater personal misfortune during the purges of the 1930's, but the intellectual content of Soviet natural science was more seriously harmed by the ideological campaigns during Stalin's final years. After Stalin's death in 1953, most of these excesses were gradually abandoned. A more flexible understanding of the relationship between Marxist-Leninist philosophy and scientific theory was worked out, and the political authorities recognized science as a cultural force that sometimes shapes ideology and economic practice, rather than simply being determined by these external forces.

One point that emerges from the book is how difficult it was to unify Marxist-Leninist philosophy and scientific theory, even in an arbitrary fashion. During the 1920's Marxist ideologists disagreed sharply with one another over the general relationship between dialectics and empirical research, as well as over the correctness of a series of important scientific ideas ranging from the theory of relativity to psychoanalysis. Even after the advent of Stalinism eliminated most differences among the ideologists, scientists, without challenging the philosophical validity of Marxism-Leninism, struggled against the ideologists' attempts to judge scientific theories in terms of their "materialist" or "idealist" character. Moreover, during most of Stalin's reign the top party leadership was reluctant to intervene decisively on behalf of the ideologists in disputes over scientific theory. The leadership encouraged ideologists to ferret out the philosophical "deviations" of scientists, but it also wanted good science; and, with the vital exception of biology, it was usually unwilling to end theoretical debates by political fiat. Since Stalin's death scientists have been increasingly able to counter the pressure from ideologists by pointing out the ideologists' lack of expertise on the scientific matters at issue. The result has been a major change in the dominant Soviet understanding of the relationship between Marxist-Leninist philosophy and the findings of the natural sciences.

The post-Stalin adjustment in the definition of the relationship of Marxism-Leninism to the social sciences has been far more equivocal. And here I have one reservation about Vucinich's analysis. Vucinich rightly points out that significant Soviet research has been resumed in sociology and some related fields; he also notes that ideological distortions still affect scholarly treatments of the Academy's own history and of the social aspects of the contemporary "scientific-technological revolution." Nevertheless, I think he overstates the degree to which the Soviet regime has accepted the need for objective research in the social sciences as a whole. The party authorities remain deeply ambivalent about disciplines like sociology and economics, which are necessary for more rational policy-making but which, if allowed to develop freely, would seriously undermine the legitimacy of the political system. If the conflict between Soviet ideologists and critically minded researchers has abated in the natural sciences, it has scarcely diminished in the social sciences.

It would be surprising, of course, if a book surveying all of Soviet science

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could command a reviewer's assent on every point of interpretation. Taken as a whole, *Empire of Knowledge* is an outstanding work, admirably researched and carefully balanced. Anyone interested in Soviet science can read it with great profit.

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A Non-nuclear Agenda

Weapons and Hope. FREEMAN DYSON. Harper and Row, New York, 1984. viii, 341 pp. $17.95. A Cornelia and Michael Bessie Book.

The author's purpose in writing this book is twofold. He wishes to offer some new ideas for overcoming the risk of nuclear annihilation, and, unlike many others committed to this task, he intends to pursue his goal by trying to bridge the gap between those who "look on the peace movement as a collection of ignorant people meddling in a business they do not understand" and those who "look on the military establishment as a collection of misguided people protected by bureaucratic formality from all contact with human realities." He accomplishes both tasks with impressive results, although his message sometimes tends to be concealed in a variety of personal reminiscences, family tales, metaphoric extemporizing, and reflections on the course of history in general.

Dyson's basic message is that the world must move away from nuclear weaponry toward defensive and non-nuclear weaponry. This implies arousing humanity against weapons of mass murder "as we roused mankind against the institution of slavery a hundred and fifty years ago," negotiating international agreements, first to reduce deployments of nuclear weapons and later to eliminate them, and pursuing further the development of non-nuclear defensive systems to enhance the stability of a non-nuclear world.

This message may seem simple, yet Dyson does not evolve and justify it in a simple way. In fact, almost the entire book is devoted to a careful examination of alternatives and a cautious evaluation of all the complexities surrounding the design for the abolition of nuclear weapons. Dyson elucidates every aspect of the subject with insights that combine first-rate expert knowledge and refreshingly unorthodox approaches. For instance, when discussing antiballistic missile systems, Dyson sums up the familiar arguments against ABM and then presents a number of rebuttals of these arguments. After thoughtful discussion he finally reaches the conclusion that his verdict on ABM is "neither guilty nor innocent." He even recommends the development of a non-nuclear ABM that in a defense-dominated world may be a good tool because in such a context ABM becomes more and more stabilizing as one moves further toward the reduction and elimination of offensive forces. Likewise, the large-scale construction of shelters will be stabilizing in a world where the principle of stable deterrence has been replaced by a defensively oriented equilibrium. As far as verification is concerned, Dyson argues against the doctrine holding unverifiable agreements to be worthless—all depends on circumstances, he says. He points to the 1975 convention banning biological weapons; although compliance with the ban is clearly unverifiable, the convention is valuable because it imposes an important constraint—"without the convention, the friends of the victims would not even have legal grounds for protest and inquiry."

This judgment is illustrative of the attitude of pragmatism and unbiased hope that characterizes the book. At one point the author drily remarks: "Our choice is not between imperfect agreements and perfect arms control agreements; it is between imperfect agreements and none at all." Examining his key proposal for a non-nuclear world with the same passion for sober-mindedness and optimism, he is aware of the innumerable requirements and consequences implied by a radical shift from the present system of assured destruction to a non-nuclear defensive system. Some of the requirements and consequences may still need further elaboration, particularly those referring to the political situation in Europe. One may agree with Dyson that the development of precision-guided munitions and of dispersed mobile forces capable of destroying tanks and airplanes offers a realistic substitute for tactical nuclear weapons in the defense of Europe against invasion. But still a concerned European might have some doubts about whether a potential aggressor might not find this kind of defense a calculable and possibly tolerable risk. And he or she would hardly feel comfortable with regard to the nonviolent use of force, that is, the potential for power projection, subtle blackmail, and "Finlandization" in peacetime.

Yet such second thoughts merely show how stimulating Dyson's arguments are. They offer an enormous number of new and creative ways of looking at the world's most burning problem. No doubt, this book will have an impact.

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Creativity

The Social Psychology of Creativity. TERESA M. AMABILE. Springer-Verlag, New York, 1983. xvi, 245 pp. $26.90. Springer Series in Social Psychology.

Most of those who study creativity focus on individual performance. They try to figure out how and why some people are able to do things in ways that are more original than what people are generally capable of doing. These researchers take a naturalistic approach—they assume that an original contribution is caused by some exceptional quality within the person who makes it and postulate the existence of creativity, a cognitive process.

Others have pointed out that there is no compelling reason for postulating any difference between a creative mental process and one that is not, or between a person who is creative and one who is not. These researchers take an attributional approach to the study of creativity—they try to understand under what conditions certain works will be deemed creative, by whom, and for what reasons.

The epistemological assumptions of Amabile's monograph are naturalistic, though her methodology favors a position intermediate between the naturalistic and the attributional camps. Amabile recognizes that "social and environmental factors seem to play a crucial role in creative performance" and that "there has been a concentration on the creative person, to the exclusion of 'creative situations'—i.e. circumstances conducive to creativity" (p. 5), but she does not question whether performances and persons are creative independent of social consensus. This reification of the phenomenon under study makes the conceptual foundation of the volume somewhat shallow, although not unusually so in a field that is all too ready to take an unquestioning stance toward its subject matter.

Amabile's most significant theoretical contribution is her emphasis on the close relationship between intrinsic motivation and what comes to be known as "cre-

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